

SEQUENCE LISTING



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Slavchenko, Iryna Yu
Chernykh, Svitlana I
Vozianov, Oleksandr

<120> METHOD OF PRODUCING BIOLOGICALLY ACTIVE
HUMAN ACIDIC FIBROBLAST GROWTH FACTOR AND ITS USE IN
PROMOTING ANGIOGENESIS

<130> CVGENG.008CP1

<140> 10/649,480

<141> 2003-08-27

<150> 09/929,945

<151> 2001-08-15

<150> 60/225,406

<151> 2000-08-15

<150> 09/358,780

<151> 1999-07-22

<150> 60/093,962

<151> 1998-07-24

<160> 8

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 630

<212> DNA

<213> Artificial Sequence

<220>

<223> Chemically synthesized sequence for human acidic
Fibroblast Growth Factor (155 amino acids) using
preferred codons for E. coli

<221> CDS

<222> (122)...(590)

<400> 1

gcgtagagga tcgagatctc gatcccgcgga aattaatacg actcactata ggggaattgt 60
gagcggataa caattcccct ctgaaataa tttgttttaa ctttaagaag gagatataca 120
t atg gct gaa ggg gaa atc acc acc ttt aca gcg tta acg gag aaa ttt 169
Met Ala Glu Gly Glu Ile Thr Thr Phe Thr Ala Leu Thr Glu Lys Phe

1

5

10

15

aac ctt ccg ccc ggg aat tac aaa aaa ccc aag ctt ctt tac tgc agt 217
 Asn Leu Pro Pro Gly Asn Tyr Lys Lys Pro Lys Leu Leu Tyr Cys Ser
 20 25 30

aac gga gga cac ttc ctg cga att ctg cca gat ggc aca gta gat ggg 265
 Asn Gly Gly His Phe Leu Arg Ile Leu Pro Asp Gly Thr Val Asp Gly
 35 40 45

act cgc gat cgc tcc gac cag cac att cag ctg caa ctc tcg gcc gaa 313
 Thr Arg Asp Arg Ser Asp Gln His Ile Gln Leu Gln Leu Ser Ala Glu
 50 55 60

agc gtt gga gag gtc tat atc aag tcg acg gag act ggc cag tac ctt 361
 Ser Val Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln Tyr Leu
 65 70 75 80

gcc atg gac acc gat ggg ctt ctg tat ggc tca cag acg cct aac gaa 409
 Ala Met Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro Asn Glu
 85 90 95

gaa tgc ttg ttt cta gaa aga cta gaa gaa aac cat tac aac acg tac 457
 Glu Cys Leu Phe Leu Glu Arg Leu Glu Glu Asn His Tyr Asn Thr Tyr
 100 105 110

ata tcg aaa aaa cat gca gag aag aac tgg ttt gta ggc ctt aaa aaa 505
 Ile Ser Lys Lys His Ala Glu Lys Asn Trp Phe Val Gly Leu Lys Lys
 115 120 125

aat ggt tcc tgt aag cgt gga cca cgg act cac tat ggc caa aag gct 553
 Asn Gly Ser Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln Lys Ala
 130 135 140

atc ttg ttc ctg cca cta cca gtg agc tcc gac taa g gatccgaatt 600
 Ile Leu Phe Leu Pro Leu Pro Val Ser Ser Asp *
 145 150 155

cgagctccgt cgacaagctt gcggccgcac 630

<210> 2

<211> 155

<212> PRT

<213> Homo sapiens

<400> 2

Met Ala Glu Gly Glu Ile Thr Thr Phe Thr Ala Leu Thr Glu Lys Phe
 1 5 10 15
 Asn Leu Pro Pro Gly Asn Tyr Lys Lys Pro Lys Leu Leu Tyr Cys Ser
 20 25 30
 Asn Gly Gly His Phe Leu Arg Ile Leu Pro Asp Gly Thr Val Asp Gly
 35 40 45
 Thr Arg Asp Arg Ser Asp Gln His Ile Gln Leu Gln Leu Ser Ala Glu
 50 55 60
 Ser Val Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln Tyr Leu
 65 70 75 80
 Ala Met Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro Asn Glu

				85					90					95					
Glu	Cys	Leu	Phe	Leu	Glu	Arg	Leu	Glu	Glu	Asn	His	Tyr	Asn	Thr	Tyr				
			100					105					110						
Ile	Ser	Lys	Lys	His	Ala	Glu	Lys	Asn	Trp	Phe	Val	Gly	Leu	Lys	Lys				
		115					120					125							
Asn	Gly	Ser	Cys	Lys	Arg	Gly	Pro	Arg	Thr	His	Tyr	Gly	Gln	Lys	Ala				
	130					135					140								
Ile	Leu	Phe	Leu	Pro	Leu	Pro	Val	Ser	Ser	Asp									
145				150						155									

<210> 3
 <211> 468
 <212> DNA
 <213> Homo sapiens

<400> 3
 atggctgaag gggaaatcac caccttcaca gccctgaccg agaagtttaa tctgcctcca 60
 ggggaattaca agaagcccaa actcctctac tgtagcaacg gggggccactt cctgaggatc 120
 cttccggatg gcacagtggg tgggacaagg gacaggagcg accagcacat tcagctgcag 180
 ctcaagtgcgg aaagcgtggg ggaggtgtat ataaagagta ccgagactgg ccagtacttg 240
 gccatggaca ccgacgggct tttatacggc tcacagacac caaatgagga atgtttgttc 300
 ctggaaaggc tggaggagaa ccattacaac acctatatat ccaagaagca tgcagagaag 360
 aattggtttg ttggcctcaa gaagaatggg agctgcaaac gcggtcctcg gactcactat 420
 ggccagaaag caatcttggt tctccccctg ccagtctctt ctgattaa 468

<210> 4
 <211> 630
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Chemically synthesized sequence for human acidic
 Fibroblast Growth Factor (134 amino acids) using
 preferred codons for E. coli

<221> CDS
 <222> (122)...(526)

<400> 4
 gcgtagagga tcgagatctc gatcccgcg aattaatacg actcactata ggggaattgt 60
 gagcggataa caattcccct ctagaataaa tttgttttaa ctttaagaag gagatataca 120
 t atg aat tac aaa aaa ccc aag ctt ctt tac tgc agt aac gga gga cac 169
 Met Asn Tyr Lys Lys Pro Lys Leu Leu Tyr Cys Ser Asn Gly Gly His
 1 5 10 15
 ttc ctg cga att ctg cca gat ggc aca gta gat ggg act cgc gat cgc 217
 Phe Leu Arg Ile Leu Pro Asp Gly Thr Val Asp Gly Thr Arg Asp Arg
 20 25 30
 tcc gac cag cac att cag ctg caa ctc tcg gcc gaa agc gtt gga gag 265
 Ser Asp Gln His Ile Gln Leu Gln Leu Ser Ala Glu Ser Val Gly Glu
 35 40 45
 gtc tat atc aag tcg acg gag act ggc cag tac ctt gcc atg gac acc 313

Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln Tyr Leu Ala Met Asp Thr	
50 55 60	
gat ggg ctt ctg tat ggc tca cag acg cct aac gaa gaa tgc ttg ttt	361
Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro Asn Glu Glu Cys Leu Phe	
65 70 75 80	
cta gaa aga cta gaa gaa aac cat tac aac acg tac ata tcg aaa aaa	409
Leu Glu Arg Leu Glu Glu Asn His Tyr Asn Thr Tyr Ile Ser Lys Lys	
85 90 95	
cat gca gag aag aac tgg ttt gta ggc ctt aaa aaa aat ggt tcc tgt	457
His Ala Glu Lys Asn Trp Phe Val Gly Leu Lys Lys Asn Gly Ser Cys	
100 105 110	
aag cgt gga cca cgg act cac tat ggc caa aag gct atc ttg ttc ctg	505
Lys Arg Gly Pro Arg Thr His Tyr Gly Gln Lys Ala Ile Leu Phe Leu	
115 120 125	
cca cta cca gtg agc tcc gac taaggatccg aattcgagct ccgtcgacaa	556
Pro Leu Pro Val Ser Ser Asp	
130 135	
gcttgcgggc gcactcgagc accaccacca ccaccactga gatccggctg ctaacaaagc	616
ccgaaaggaa gctg	630

<210> 5
 <211> 135
 <212> PRT
 <213> Homo sapiens

<400> 5	
Met Asn Tyr Lys Lys Pro Lys Leu Leu Tyr Cys Ser Asn Gly Gly His	
1 5 10 15	
Phe Leu Arg Ile Leu Pro Asp Gly Thr Val Asp Gly Thr Arg Asp Arg	
20 25 30	
Ser Asp Gln His Ile Gln Leu Gln Leu Ser Ala Glu Ser Val Gly Glu	
35 40 45	
Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln Tyr Leu Ala Met Asp Thr	
50 55 60	
Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro Asn Glu Glu Cys Leu Phe	
65 70 75 80	
Leu Glu Arg Leu Glu Glu Asn His Tyr Asn Thr Tyr Ile Ser Lys Lys	
85 90 95	
His Ala Glu Lys Asn Trp Phe Val Gly Leu Lys Lys Asn Gly Ser Cys	
100 105 110	
Lys Arg Gly Pro Arg Thr His Tyr Gly Gln Lys Ala Ile Leu Phe Leu	
115 120 125	
Pro Leu Pro Val Ser Ser Asp	
130 135	

<210> 6
 <211> 630
 <212> DNA

<213> Artificial Sequence

<220>

<223> Chemically synthesized sequence for human acidic
Fibroblast Growth Factor (140 amino acids) using
preferred codons for E. coli

<221> CDS

<222> (122)...(544)

<400> 6

gcgtagagga tcgagatctc gatcccgcca aattaatacg actcactata ggggaattgt 60
gagcggataa caattcccct ctagaataaa tttgttttaa ctttaagaag gagatataca 120
t atg ttt aac ctt ccg ccc ggg aat tac aaa aaa ccc aag ctt ctt tac 169

Met Phe Asn Leu Pro Pro Gly Asn Tyr Lys Lys Pro Lys Leu Leu Tyr

1 5 10 15

tgc agt aac gga gga cac ttc ctg cga att ctg cca gat ggc aca gta 217
Cys Ser Asn Gly Gly His Phe Leu Arg Ile Leu Pro Asp Gly Thr Val

20 25 30

gat ggg act cgc gat cgc tcc gac cag cac att cag ctg caa ctc tcg 265
Asp Gly Thr Arg Asp Arg Ser Asp Gln His Ile Gln Leu Gln Leu Ser

35 40 45

gcc gaa agc gtt gga gag gtc tat atc aag tcg acg gag act ggc cag 313
Ala Glu Ser Val Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln

50 55 60

tac ctt gcc atg gac acc gat ggg ctt ctg tat ggc tca cag acg cct 361
Tyr Leu Ala Met Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro

65 70 75 80

aac gaa gaa tgc ttg ttt cta gaa aga cta gaa gaa aac cat tac aac 409
Asn Glu Glu Cys Leu Phe Leu Glu Arg Leu Glu Glu Asn His Tyr Asn

85 90 95

acg tac ata tcg aaa aaa cat gca gag aag aac tgg ttt gta ggc ctt 457
Thr Tyr Ile Ser Lys Lys His Ala Glu Lys Asn Trp Phe Val Gly Leu

100 105 110

aaa aaa aat ggt tcc tgt aag cgt gga cca cgg act cac tat ggc caa 505
Lys Lys Asn Gly Ser Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln

115 120 125

aag gct atc ttg ttc ctg cca cta cca gtg agc tcc gac taaggatccg 554
Lys Ala Ile Leu Phe Leu Pro Leu Pro Val Ser Ser Asp

130 135 140

aattcgagct ccgtcgacaa gcttgcggcc gcactcgagc accaccacca ccaccactga 614
gatccggctg ctaaca 630

<210> 7

<211> 141

<212> PRT

<213> Homo sapiens

<400> 7

Met	Phe	Asn	Leu	Pro	Pro	Gly	Asn	Tyr	Lys	Lys	Pro	Lys	Leu	Leu	Tyr
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Cys	Ser	Asn	Gly	Gly	His	Phe	Leu	Arg	Ile	Leu	Pro	Asp	Gly	Thr	Val
			20					25					30		
Asp	Gly	Thr	Arg	Asp	Arg	Ser	Asp	Gln	His	Ile	Gln	Leu	Gln	Leu	Ser
		35					40					45			
Ala	Glu	Ser	Val	Gly	Glu	Val	Tyr	Ile	Lys	Ser	Thr	Glu	Thr	Gly	Gln
	50					55					60				
Tyr	Leu	Ala	Met	Asp	Thr	Asp	Gly	Leu	Leu	Tyr	Gly	Ser	Gln	Thr	Pro
65				70						75					80
Asn	Glu	Glu	Cys	Leu	Phe	Leu	Glu	Arg	Leu	Glu	Glu	Asn	His	Tyr	Asn
			85					90						95	
Thr	Tyr	Ile	Ser	Lys	Lys	His	Ala	Glu	Lys	Asn	Trp	Phe	Val	Gly	Leu
			100					105						110	
Lys	Lys	Asn	Gly	Ser	Cys	Lys	Arg	Gly	Pro	Arg	Thr	His	Tyr	Gly	Gln
		115					120					125			
Lys	Ala	Ile	Leu	Phe	Leu	Pro	Leu	Pro	Val	Ser	Ser	Asp			
	130					135						140			

<210> 8

<211> 154

<212> PRT

<213> Homo sapiens

<400> 8

Ala	Glu	Gly	Glu	Ile	Thr	Thr	Phe	Thr	Ala	Leu	Thr	Glu	Lys	Phe	Asn
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Leu	Pro	Pro	Gly	Asn	Tyr	Lys	Lys	Pro	Lys	Leu	Leu	Tyr	Cys	Ser	Asn
			20					25					30		
Gly	Gly	His	Phe	Leu	Arg	Ile	Leu	Pro	Asp	Gly	Thr	Val	Asp	Gly	Thr
		35					40						45		
Arg	Asp	Arg	Ser	Asp	Gln	His	Ile	Gln	Leu	Gln	Leu	Ser	Ala	Glu	Ser
	50					55					60				
Val	Gly	Glu	Val	Tyr	Ile	Lys	Ser	Thr	Glu	Thr	Gly	Gln	Tyr	Leu	Ala
65				70						75					80
Met	Asp	Thr	Asp	Gly	Leu	Leu	Tyr	Gly	Ser	Gln	Thr	Pro	Asn	Glu	Glu
			85					90						95	
Cys	Leu	Phe	Leu	Glu	Arg	Leu	Glu	Glu	Asn	His	Tyr	Asn	Thr	Tyr	Ile
			100					105						110	
Ser	Lys	Lys	His	Ala	Glu	Lys	Asn	Trp	Phe	Val	Gly	Leu	Lys	Lys	Asn
		115					120					125			
Gly	Ser	Cys	Lys	Arg	Gly	Pro	Arg	Thr	His	Tyr	Gly	Gln	Lys	Ala	Ile
	130					135						140			
Leu	Phe	Leu	Pro	Leu	Pro	Val	Ser	Ser	Asp						
145					150										